

One new and one little known olethreutine moths (Lepidoptera, Tortricidae) from Japan

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Abstract *Rhyacionia vernalis* sp. nov. is described from Japan. *Endothenia quadrimaculana* (Haworth), little known from Japan, is recorded with illustrations of adult and genitalia.

Key words Tortricidae, *Endothenia quadrimaculana* (Haworth), *Rhyacionia vernalis* sp. nov., genitalia, Japan.

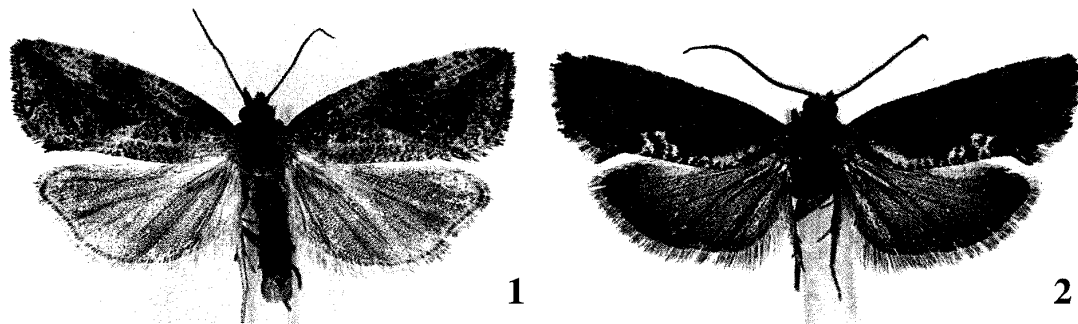
We examined two unfamiliar olethreutine moths collected by the second author from East Hokkaido, Japan. They represent a new species of *Rhyacionia* Hübner, 1825 and *Endothenia quadrimaculana* (Haworth, 1811). The latter is little known in Japan though Kuznetsov (1993, 1994, 2001) and Razowski (2003) have included Japan in the range of the species. In the following lines we will describe the former as new to science and record the latter from Japan, with illustrations of adults and genitalia.

The holotype of the new species is preserved in the collection of the Entomological Laboratory of Osaka Prefecture University, Sakai, Japan (UOP), and the other materials are in the collections of Y. Nasu (YNC) and S. Kawahara (SKC). We wish to acknowledge Dr T. Oku, Morioka, Japan, for his kind advice on our work.

Endothenia quadrimaculana (Haworth) (Figs 1, 3, 5)

Tortrix quadrimaculana Haworth, 1811, *Br. Lepid.* 3: 468.

Endothenia quadrimaculana: Hanneman, 1961: 192, fig. 398 (♂ genitalia), pl. 17, figs 16–18 (adults); Bentinck & Diakonoff, 1968: 165, pl. 24, fig. 12 (adult), pl. 90, fig. 247a–c (♂♀ genitalia); Bradley *et al.*, 1972: 32; Kuznetsov, 1978: 454, fig. 395-2 (♂ genitalia); Bradley *et al.*, 1979: 65, pl. 26, figs 16–18 (adults); Leraut, 1980: 93; Palm, 1982: 53; Palm, 1985: 72; Razowski, 1983: 124, pl. 11, figs 7, 8 (adults), fig. 103 (♂ genitalia), fig. 178 (♀ genitalia); Emmet, 1988: 175; Emmet, 1991: 152; Kuznetsov, 1993: 28, figs 6, 7 (♂ genitalia); Kuznetsov, 1994: 142; Razowski, 1995: 292; Razowski, 1996: 142; Leraut, 1997: 151; Patočka, 1998: 90, figs 1018–1026 (pupa); Chambon, 1999: 392, fig. 2552 (♂



Figs 1–2. Adults. 1. *Endothenia quadrimaculana* (Haworth), ♂. 2. *Rhyacionia vernalis* sp. nov., holotype, ♂.

genitalia); Parenti, 2000: pl. 111, fig. 6 (adult); Kuznetsov, 2001: 212, fig. 127-1 (♂ genitalia); Razowski, 2001: 59, pl. 30, fig. 229 (♂ genitalia), pl. 105, fig. 229 (♂ genitalia), col. pl. 11, fig. 229 (adult); Razowski, 2003: 21, col. pl. 2, fig. 19 (♂ genitalia), pl. 55, fig. 19 (♀ genitalia), col. pl. 1, fig. 19 (adult). *Tortrix antiquana* Hübner, 1813, *Sammlung eur. Schmett.*, *Tortrices*, pl. 34, figs 213, 214. *Eutrachia antiquana* Hübner, 1822, *Syst.-alphabet. Verz.*: 58 (an unjustified emendation of *antiquana* Hübner, 1813). *Grapholitha (Sericoris) antiquana* [sic]: Heinemann, 1863: 133; Snellen, 1882: 297. *Penthina antiquana* [sic]: Wocke, 1871: 250. *Eucosma antiquana* [sic]: Meyrick, 1895: 469. *Olethreutes antiquana* [sic]: Rebel, 1901: 108; Shütze, 1931: 169. *Algyoploce antiquana* [sic]: Kennel, 1910: 268, pl. 85, fig. 20 (adult); Kennel, 1916: 420, pl. 17, figs 42, 43 (adults); Pierce & Metcalfe, 1922: 47, pl. 16 (♂ ♀ genitalia). *Endothenia antiquana* [sic]: Meyrick, 1928: 567; Benander, 1950: 75, pl. 4, fig. 19 (wing); Swatschek, 1958: 202 (larva); Bradley, 1959: 74, pl. 16, fig. 185 (adult). *Orthotaenia obesana* Peyerimhoff, 1863, *Cat. Lépid. d'Alsace*: 118. *Penthina helvinana* Kennel, 1900, *Dt. ent. Z. Iris* **13**: 138, pl. 5, fig. 14 (adult). *Algyoploce antiquana* var. *pallidana* Caradja, 1916, *Dt. ent. Z. Iris* **30**: 58.

Diagnosis. Sexual dimorphism is not pronounced. The moth (wing expanse: ♂ 17–19 mm, ♀ 19 mm) has a yellowish (or light grayish) brown forewing with a large dark brown triangular patch on the apical half. The male genitalia are characterized by an uncus wide-dilated distally with some spine-like setae and a slender valva. The female genitalia are characterized by a large oblong lamella postvaginalis and a pocket-shaped signum.

Material examined. JAPAN: Hokkaido: Koshimizu-cho, Yanbetsu, 1 ♂, 13. VIII. 1991 (S. Kawahara leg.), YNC; Hokuto, 1 ♂, 7. VII. 1993 (S. Kawahara leg.), YNC, 1 ♂, 7. VII., 1 ♂, 5. VIII. 1993 (S. Kawahara leg.), SKC, 1 ♀, 13. VIII. 1993 (S. Kawahara leg.), YNC; Miwa, 1 ♂, 17. VIII. 2002 (S. Kawahara leg.), YNC. All materials were collected at light.

Distribution. Europe, Russia, Asia Minor, Kazakhstan, Mongolia (Razowski, 1995, 2003), China (Kuznetsov, 1993, 1994, 2001), Japan (Hokkaido).

Host-plant. Boraginaceae: *Symphytum officinale* L. (Swatschek, 1958; Bradley *et al.*, 1979). Euphorbiaceae: *Euphorbia amygdaloides* L. (Razowski, 2001, 2003). Labiatae: *Mentha spicata* L. (Bradley *et al.*, 1979), *Stachys palustris* L., *St. arvensis* L. (Swatschek, 1958; Bradley *et al.*, 1979), *Lamium album* L., *St. affinis* Bunge (Kuznetsov, 1994; Razowski, 2003).

Biology. According to Bradley *et al.* (1979), the larvae tunnel in the roots and underground stems of *Stachys palustris*, lining the galleries with silk, from August to May in England. Pupation takes place in a cocoon spun up in the soil or amongst surface litter in May to June. During the day the moth hides low down amongst the herbage, but in the late afternoon it becomes active, flies freely about its habitat at sunset and later comes to light. Based on the description of the species by Kuznetsov (1994), Razowski (2003) stated that the species has two generations per year in Southern Europe. The various instar larvae hibernate and pupate in the cocoons in spring. The eggs are deposited singly or in small groups on the leaves near the soil; hatching requires 15–17 days at 15°C.

Remarks. *Endothenia* Stephens, 1852 is chiefly distributed in the Holarctic region, and twenty-four species have been recorded from the Palearctic (Razowski, 1995), sixteen from the Nearctic (Powell, 1983), six from the Oriental (Diakonoff, 1973), and one from Australia (Horak *et al.*, 1996), including the Holarctic species, *E. hebesana* (Walker, 1863). In Japan sixteen species have hitherto been recorded (Kawabe, 1982; Kuznetsov, 1993, 1994, 2001; Oku *et al.*, 1997; Oku, 2003). The moths of most species have dark brown forewings without conspicuous markings. Supposed autapomorphies of the genus are

proposed by Razowski (1989): transverse bar connecting lateral parts of tegumen fused with dorsal part of anellus in the middle, process armed with spine-like setae near posterior edge of basal opening and pocket-shaped signum. Moths of the genus are mainly associated with the family Labiatae, and the larvae bore into the stems and roots, sometimes making galls.

The Japanese species examined here is identical with European *E. quadrimaculana* in the external features and genitalic characters. Kuzentsov (1993, 1994, 2001) and Razowski (2003) included Japan in the range of this species, but did not include information on examined material(s) of Japan or the original source(s) of information about the occurrence of the species in Japan. The species has been little known in Japan. The moth is superficially similar to *E. menthivora* (Oku, 1963) distributed in the Far East of Russia and Japan, but differs from it in having a wider triangular forewing, yellowish brown ground color, a large dark brown triangular patch from the middle to the apex, an uncus wide-dilated distally, a slender valva, and a large oblong lamella postvaginalis. The larval and pupal structures of this species were studied by Swatschek (1958) and Patočka (1998) respectively.

The species has been recorded from North America by some authors, *e. g.* Heinrich (1926), Powell (1983) and Kuznetsov (1993, 2001). Heinrich (1926) treated North American *E. nubilana* (Clemens, 1865) as a subspecies of European *E. antiquana* (as *antiquana*), judging from the similarities of forewing markings and genitalia. Powell (1983) followed Heinrich's decision and recorded *E. quadrimaculana* (= *antiquana*) *nubilana* from North America. However, Miller (1983) regarded North American *E. nubilana* as a separate species from European *E. quadrimaculana* based on differences in the shape of the uncus and the number of spine-like setae on it. Therefore the record of occurrence of the species in North America was expunged. We follow Miller's decision.

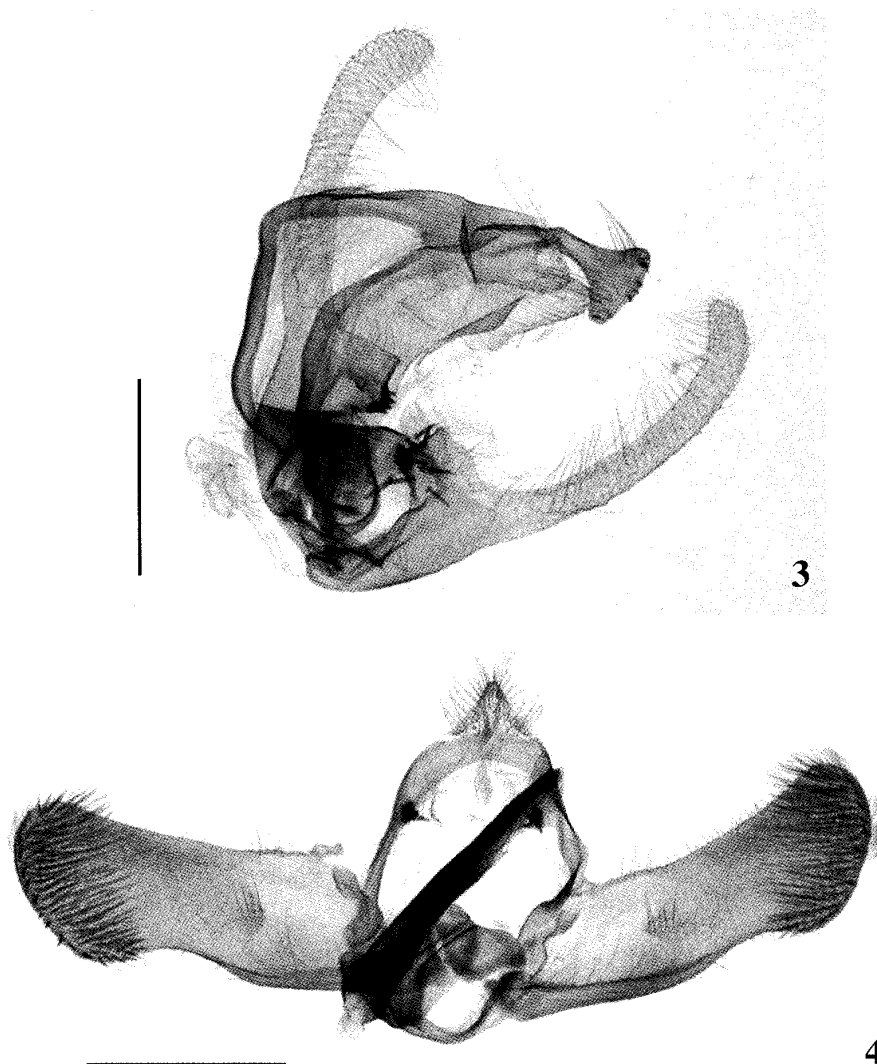
***Rhyacionia vernalis* Nasu et Kawahara, sp. nov.** (Figs 2, 4, 6)

Rhyacionia sp.: Oku, 2003: 130.

Diagnosis. Sexual dimorphism is not pronounced. This species has a dark grayish brown forewing with a conspicuous whitish dorsal patch and a whitish streak running along the dorsum at the base. The male genitalia are characterized by fused socii, a long tube-shaped aedeagus and an oblong valva. The female genitalia are characterized by very large papillae anales and large falcate signa.

Description. Male (Fig. 2). Wing expanse 18–19 mm. Head and labial palpus blackish brown, tips of scales whitish. Antenna filiform, blackish brown. Thorax and tegula blackish brown, tips of scales whitish. Forewing elongate, apex somewhat sharp. Ground color dark grayish brown, tips of scales whitish, scattered with blackish brown scales. Costa blackish brown, with eight pairs of whitish strigulae from apex to basal 1/5, the first three pairs of strigulae distinct, the remaining pairs indistinct. Dorsal patch consisting of three or four whitish oblique dashes beyond the middle of dorsum. A whitish streak running from middle of base of wing to middle of dorsum, connected to dorsal patch. Cilia dark grayish brown, whitish on apical half and tornus. Hindwing light grayish brown, darker along termen; cilia concolorous with wing.

Male genitalia (Fig. 4). Uncus absent. Socii fused together, forming a large triangular lobe. Gnathos weakly sclerotized in the middle. Valva oblong, somewhat constricted before cucullus; basal opening large, with a setal process on the posterior edge; sacculus strongly sclerotized, with a ridge on the inner side. Cucullus oval, setose. Aedeagus a long



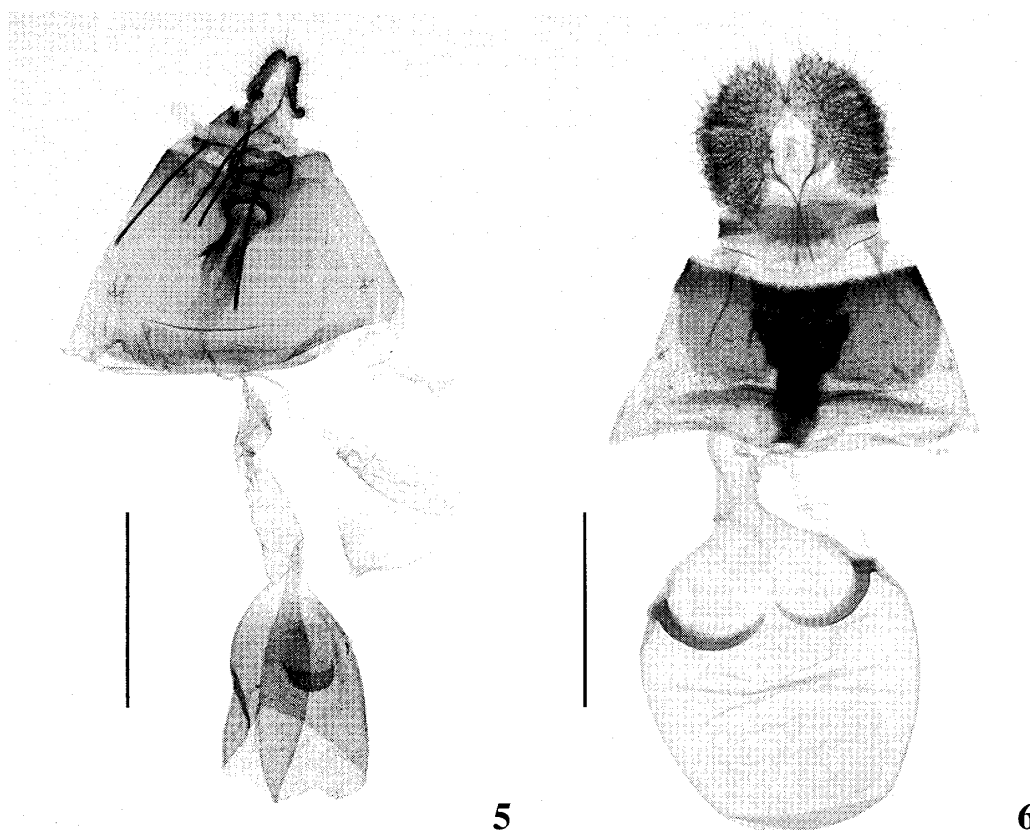
Figs 3–4. Male genitalia. 3. *Endothenia quadrimaculana* (Haworth), genitalia slide YN1083. 4. *Rhyacionia vernalis* sp. nov., holotype, genitalia slide YN1115. Scales: 0.5 mm.

tube, curved, strongly sclerotized, with two small processes on the dorsal tip and two processes on the ventral side at 1/3; vesica with rows of many short cornuti. Caulis long, curved.

Female. Wing expanse 18 mm. Similar to male.

Female genitalia (Fig. 6). Papillae anales very large, flat. Apophyses posteriores as long as apophyses anteriores. Eighth tergite well-sclerotized, and eighth sternite membranous, spinulose on the surface. Seventh tergite well-sclerotized, and seventh sternite strongly sclerotized in the middle, forming a triangular plate, not fused with ostium bursae. Lamella postvaginalis a rectangular plate, fused with ostium bursae. Ostium bursae and caudal part of ductus bursae strongly sclerotized, forming a funnel-shaped antrum. Ductus bursae strongly curved in the middle; ductus seminalis originating from the middle. Corpus bursae globular, with two large falcate signa posterolaterally.

Material examined. Holotype. ♂, JAPAN: Hokkaido: Koshimizu-cho, Miwa, 2. V. 2003



Figs 5–6. Female genitalia. 5. *Endothenia quadrimaculana* (Haworth), genitalia slide YN1116. 6. *Rhyacionia vernalis* sp. nov., genitalia slide YN1114. Scales: 1 mm.

(S. Kawahara leg.), genitalia slide YN1115, UOP. Paratypes. Same locality as holotype, 6 ♂, 23. IV. 2002, 7 ♂, 2. V., 1 ♀, 13. V. 2003 (S. Kawahara leg.), YNC. Other materials. Same locality as holotype, 5 ♂, 21–22. IV. 2002, 2 ♂, 2. V. 2003 (S. Kawahara leg.), SKC. All materials were collected during the day.

Distribution. Japan (Hokkaido, Honshu :Iwate Pref.).

Host-plant. Unknown.

Biology. The adults were observed to rest on and fly about the twigs of *Juglans sieboldiana* Maxim (family Juglandaceae) during the day by the second author. The species may be associated with the plant.

Etymology. The specific name is based on the Latin *vernalis* (belonging to spring) in reference to the early occurrence (April, May) of the adults in Hokkaido.

Remarks. *Rhyacionia* is widely distributed in the Holarctic and Neotropical regions, and consists of twelve species in the Palearctic (Razowski, 1999) and twenty-two in the Nearctic (Powell, 1983). The European *R. buoliana* ([Denis et Schiffermüller], 1775) was accidentally introduced to North America in the early 1900's and then also to South America (Powell & Miller, 1978). Most adults of the genus have brownish forewings with many shining grayish transverse streaks, rudimental unci, small socii, oblong valvae, long tube-shaped aedeagi, curved, strongly sclerotized, and funnel-shaped antra. Razowski (1989) proposed a supposed autapomorphy of the genus: swelling or process on the inner side of the neck of the valva. Moths of the genus are associated with the genus *Pinus*

(family Pinaceae), and the larvae bore into the buds and shoots. In Japan six species have hitherto been known (Kawabe, 1982; Nasu & Kogi, 1997; Oku, 2003).

This new species is quite easily distinguishable from the other congeners by a dark grayish brown forewing with a conspicuous whitish dorsal patch and a basal streak along the dorsum. The species has some advanced characters, which are hardly found in other congeners: fused socii, very large papillae anales and falcate signa. Oku (2003) temporally assigned the species to *Rhyacionia* on account of these advanced characters. But, we consider that the species belongs to the genus because of the possession of a long tube-shaped aedeagus, curved, strongly sclerotized, and funnel-shaped antrum, which are the characteristics of the genus.

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摘 要

日本産ヒメハマキガ (鱗翅目, ハマキガ科) の1新種とほとんど知られていない種の記録 (那須義次・川原 進)

第2著者の川原により北海道東部から最近採集されたヒメハマキガ標本を検討したところ, *Rhyacionia* 属の1新種と日本においてほとんど知られていない *Endothenia quadrimaculana* (Haworth) を認めたので報告する.

Endothenia quadrimaculana (Haworth) ニセハッカノメムシガ (新称) (Figs 1, 3, 5)

Kuznetsov (1993, 1994, 2001) と Razowski (2003) は, 本種の分布域に日本を含めているが, 我が国ではほとんど知られていなかった種である.

分布: ヨーロッパ, ロシア, 小アジア, カザフスタン, モンゴル, 中国, 日本 (北海道).

寄主植物: イヌゴマ属, ハッカ属 (シソ科) など. ヨーロッパでは寄主植物の根あるいは地下茎に幼虫が食入することが知られている. 我が国では幼虫は未発見.

本種はロシア極東部と日本に分布する *Endothenia menthivora* (Oku) ハッカノメムシガに外部表徴で類似するが, より幅広い前翅をもつこと, 前翅の地色が黄褐色であること, 前翅の中央部から翅頂にかけて暗褐色の3角形紋をもつこと, ♂ゲニタリアにおいて先端が幅広くなったウックスをもつこと, より細長いバルバをもつこと, ♀ゲニタリアにおいて大きな長方形のラメラ・ポストバギナリスをもつことで区別できる.

Rhyacionia vernalis Nasu et Kawahara, sp. nov. アトシロモンヒメハマキ (新称) (Figs 2, 4, 6)

本種は, 奥 (2003) により *Rhyacionia* sp. として岩手県から記録された種である.

分布: 日本 (北海道, 本州: 岩手県).

寄主植物: 不明. 川原は, 日中, オニグルミ (クルミ科) の枝で静止していたり, 枝上を飛翔している多数の成虫を観察しており, オニグルミが本種の寄主かもしれない.

本種は他の近縁種と非常に異なった斑紋 (前翅の地色が暗灰褐色, 内縁に顕著な白色紋と内縁基部に白色線をもつ) をもつことにより, 他種との識別は容易である. 本種は特異な斑紋をもつことに加えて, ♂ゲニタリアの左右のソキイが癒合し3角形の葉片を形成する, ♀ゲニタリアではパピラ・アナレスが非常に大きく発達する, シグナが鎌状であるといった, 他の近縁種にほとんど見られない特徴ももつ. これら特異な形質をもつため, 奥 (2003) は本種を仮に *Rhyacionia* 属においた. しかし, 本種は本属の特徴である強く硬化した長くてわん曲した筒状のエデアグスおよび漏斗状のアントルムをもつことにより, 本属の一員と見なされる.

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